

9-2022

## Upper Limb Capabilities, Self-Care and Fine Motor Activities with and Without Equipment in Persons with Cervical Spinal Cord Injury at Discharge from Rehabilitation and 1 Year Post-Injury

Ralph J. Marino  
*Thomas Jefferson University*

David Chen  
*The Shirley Ryan AbilityLab*

Sara Mulroy  
*Rancho Los Amigos National Rehabilitation Center*

Edelle Field-Fote  
*Shepherd Center*

Follow this and additional works at: <https://jdc.jefferson.edu/rmposters>

Benjamin Leiby  
 Part of the [Rehabilitation and Therapy Commons](#)

**[Let us know how access to this document benefits you](#)**

---

### Recommended Citation

Marino, Ralph J.; Chen, David; Mulroy, Sara; Field-Fote, Edelle; and Leiby, Benjamin, "Upper Limb Capabilities, Self-Care and Fine Motor Activities with and Without Equipment in Persons with Cervical Spinal Cord Injury at Discharge from Rehabilitation and 1 Year Post-Injury" (2022). *Department of Rehabilitation Medicine Posters*. 13.  
<https://jdc.jefferson.edu/rmposters/13>

This Article is brought to you for free and open access by the Jefferson Digital Commons. The Jefferson Digital Commons is a service of Thomas Jefferson University's [Center for Teaching and Learning \(CTL\)](#). The Commons is a showcase for Jefferson books and journals, peer-reviewed scholarly publications, unique historical collections from the University archives, and teaching tools. The Jefferson Digital Commons allows researchers and interested readers anywhere in the world to learn about and keep up to date with Jefferson scholarship. This article has been accepted for inclusion in Department of Rehabilitation Medicine Posters by an authorized administrator of the Jefferson Digital Commons. For more information, please contact: [JeffersonDigitalCommons@jefferson.edu](mailto:JeffersonDigitalCommons@jefferson.edu).

# Upper limb capabilities, self-care and fine motor activities with and without equipment in persons with cervical spinal cord injury at discharge from rehabilitation and 1 year post-injury

Marino RJ<sup>1</sup>, Chen D<sup>2</sup>, Mulroy S<sup>3</sup>, Field-Fote E<sup>4</sup>, Leiby B<sup>1</sup>

<sup>1</sup>Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, PA; <sup>2</sup>Shirley Ryan AbilityLab, Chicago, IL; <sup>3</sup>Rancho Los Amigos National Rehabilitation Center, Downey, CA; <sup>4</sup>Shepherd Center, Atlanta, GA

**Introduction:** There is little information on the impact of assistive technology or devices (AT) on function. The purpose of this project was to explore the impact of AT on self-care (SC) and fine motor (FM) function in persons with cervical SCI, and to examine the functional capabilities of those who benefit from AT.

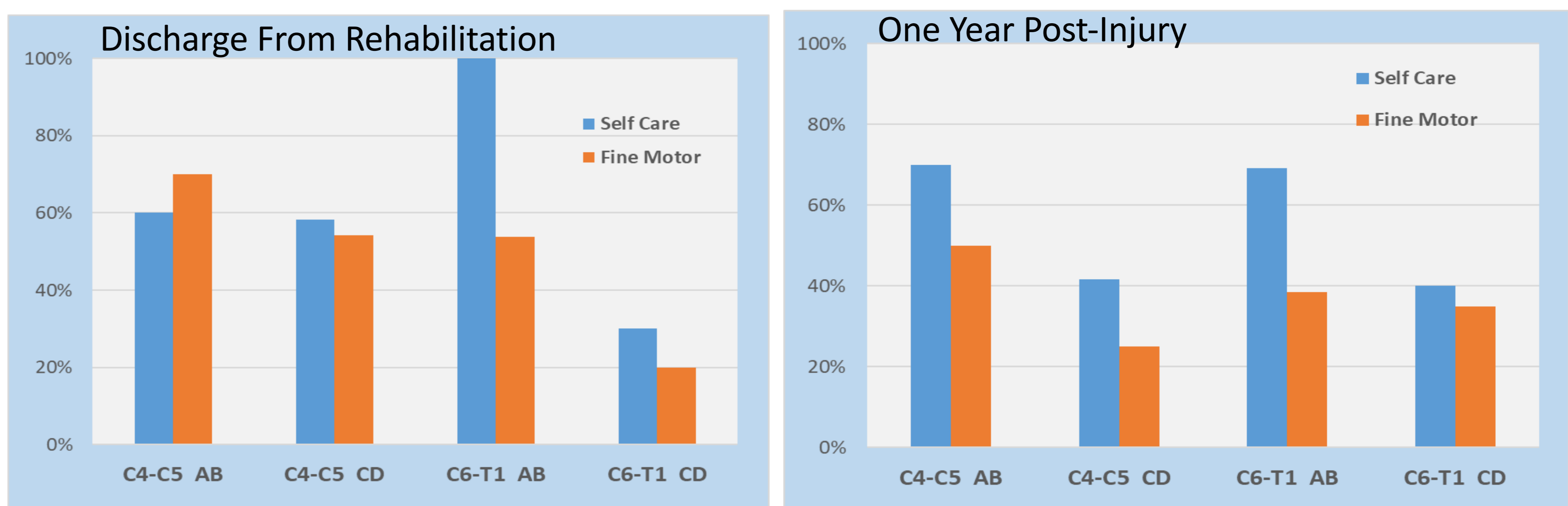
**Methods:** Persons with acute cervical SCI, all levels and AIS grades, with an upper extremity motor score (UEMS) > 0 were enrolled. At discharge from rehabilitation and 1 year post-injury we collected the Capabilities of Upper Extremity questionnaire (CUE-Q), and the combined SC and FM questions of the SCI Functional Index (SCI-FI) and SCI-FI/AT short forms. The arm with the highest CUE-Q side score was designated the better side. The impact of AT on SC and FM function was evaluated by looking at the difference in SCI-FI and SCI-FI/AT scores, and changes over time.

**Results:** There were 67 participants with data at rehab discharge and 1-year post-injury, 50 male and 17 female, average age 43.3 ± 15.6 years.

- Median scores by neurologic groupings are shown in the table. All groups demonstrated improvements in CUE-Q and SCI-FI scores from discharge to 1 year post-injury (**table and radar charts**).
- By neurologic group, AT was useful for the greatest percentage of persons classified as C4-C5 AB for FM and C6-T1 AB for SC, least useful for C6-T1 CD (**charts at right**).
- AT was helpful for the greatest number of items for SC in the C4-C5 CD group at discharge (**bolded numbers in table**).
- There tended to be less use of AT for tasks at 1 year compared to rehab discharge. For example, the percentage of persons using AT for brushing teeth at discharge was 48%, while at 1 year it was only 25%.

Table		Median Score at Discharge and 1-year post-injury										
BML	AIS	N (%)	Best side CUE (0-60)		Self-care (0-48)		Self-care AT (0-48)		Fine Motor (0-48)		Fine Motor AT (0-48)	
			DC	1-YR	DC	1-YR	DC	1-YR	DC	1-YR	DC	1-YR
C4-C5	AB	10 (15)	14.5	20.0	1.5	3.0	2.5	5.5	2.0	8.0	5.0	9.0
C4-C5	CD	24 (36)	33.5	48.5	<b>9.0</b>	23.5	<b>13.0</b>	25.0	11.5	27.0	15.5	28.5
C6-T1	AB	13 (19)	38.0	50.0	18.0	29.0	20.0	32.0	16.0	28.0	17.0	28.0
C6-T1	CD	20 (30)	53.0	58.0	32.5	41.0	34.5	43.0	32.5	40.5	35.0	40.5

Percent of participants who were helped on at least one SCI-FI item using AT by neurologic group

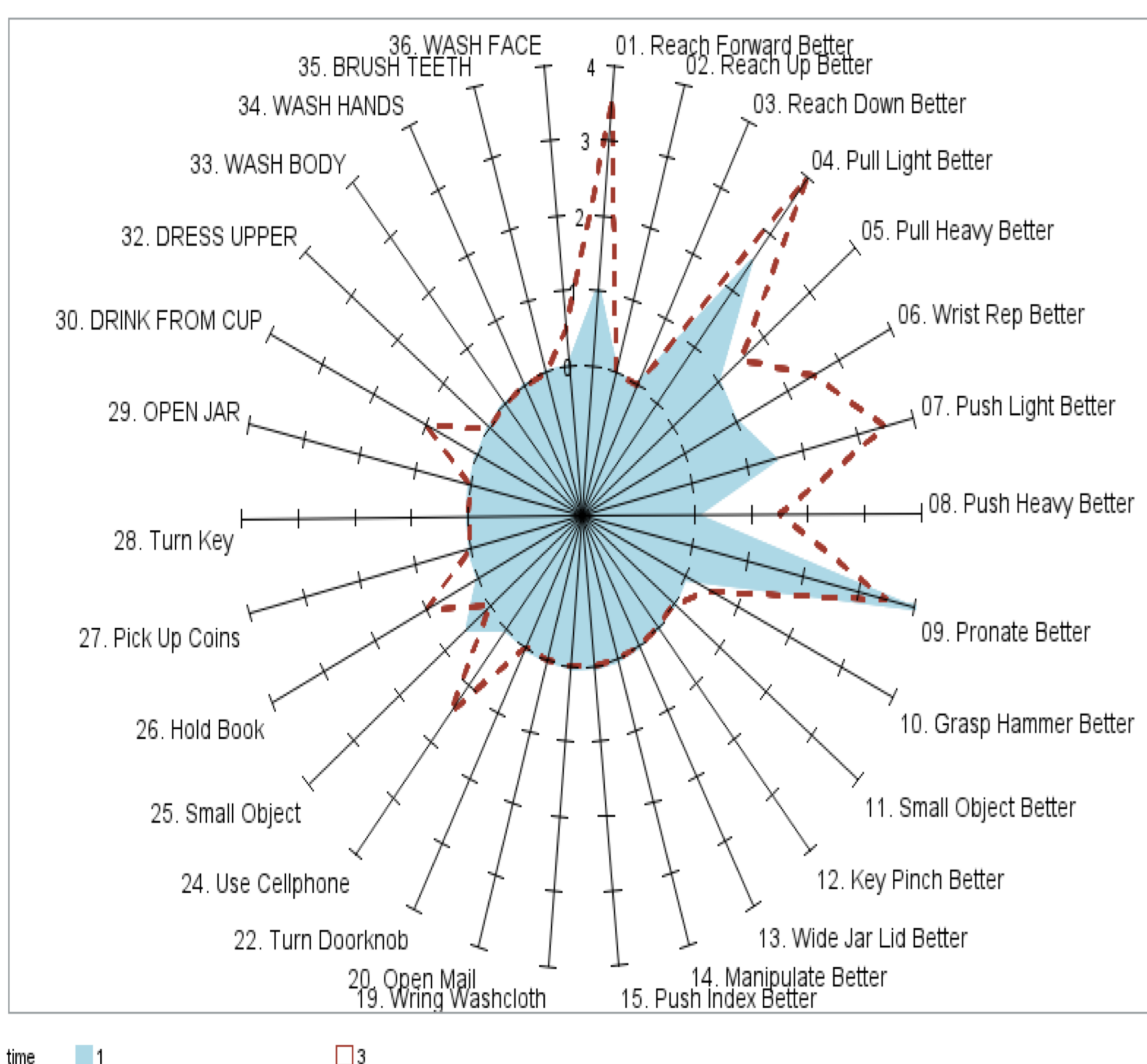


**Radar Charts:** Scores of CUE-Q and SCI-FI items from zero (innermost circle) to 4 (outer circle).

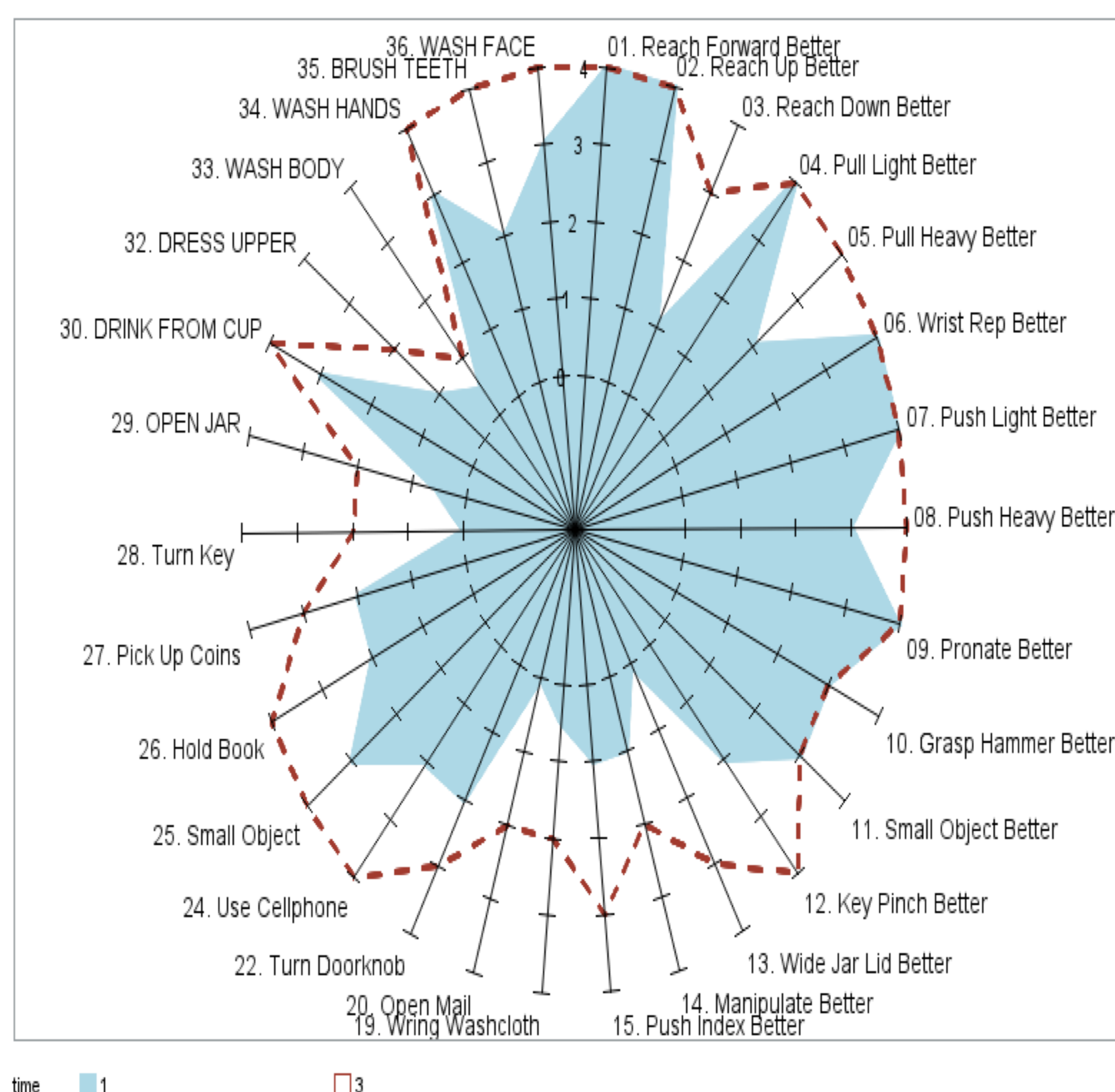
(scores 0= unable to do; 1=much/severe difficulty; 2=some/moderate difficulty; 3=a little/mild difficulty; 4=no difficulty)

**Below:** Better side CUE-Q items on right and SCI-FI items on left. Blue shading represents scores at rehab discharge. Red dashed line scores at 1-year post-injury. Distance along radius from blue shading to red line represents improvement from discharge to one-year post-injury.

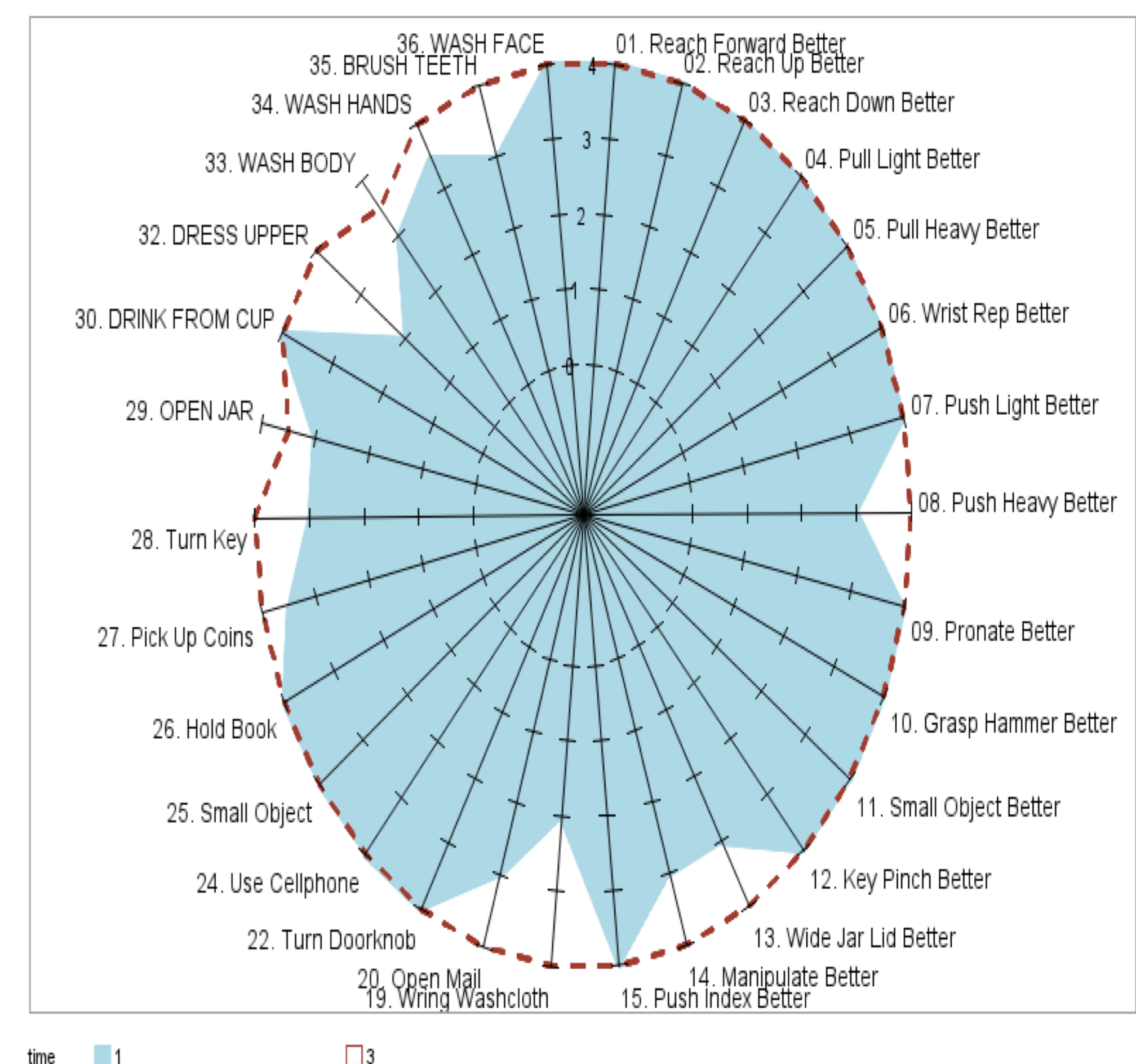
C45 AB SCI-FI and CUE Better Side Median Scores



C6-T1 AB SCI-FI and CUE Better Side Median Scores



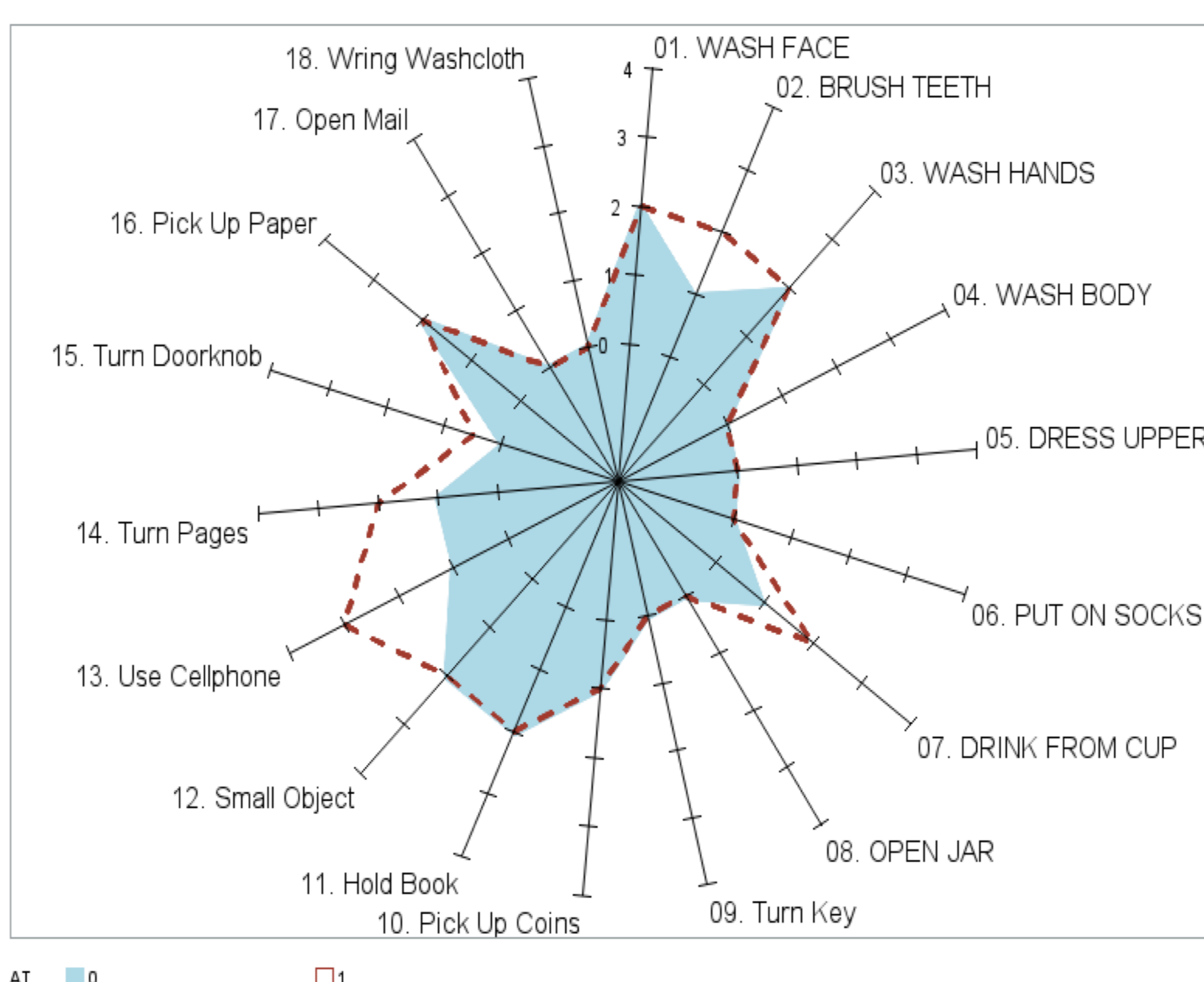
C6-T1 CD SCI-FI and CUE Better Side Median Scores



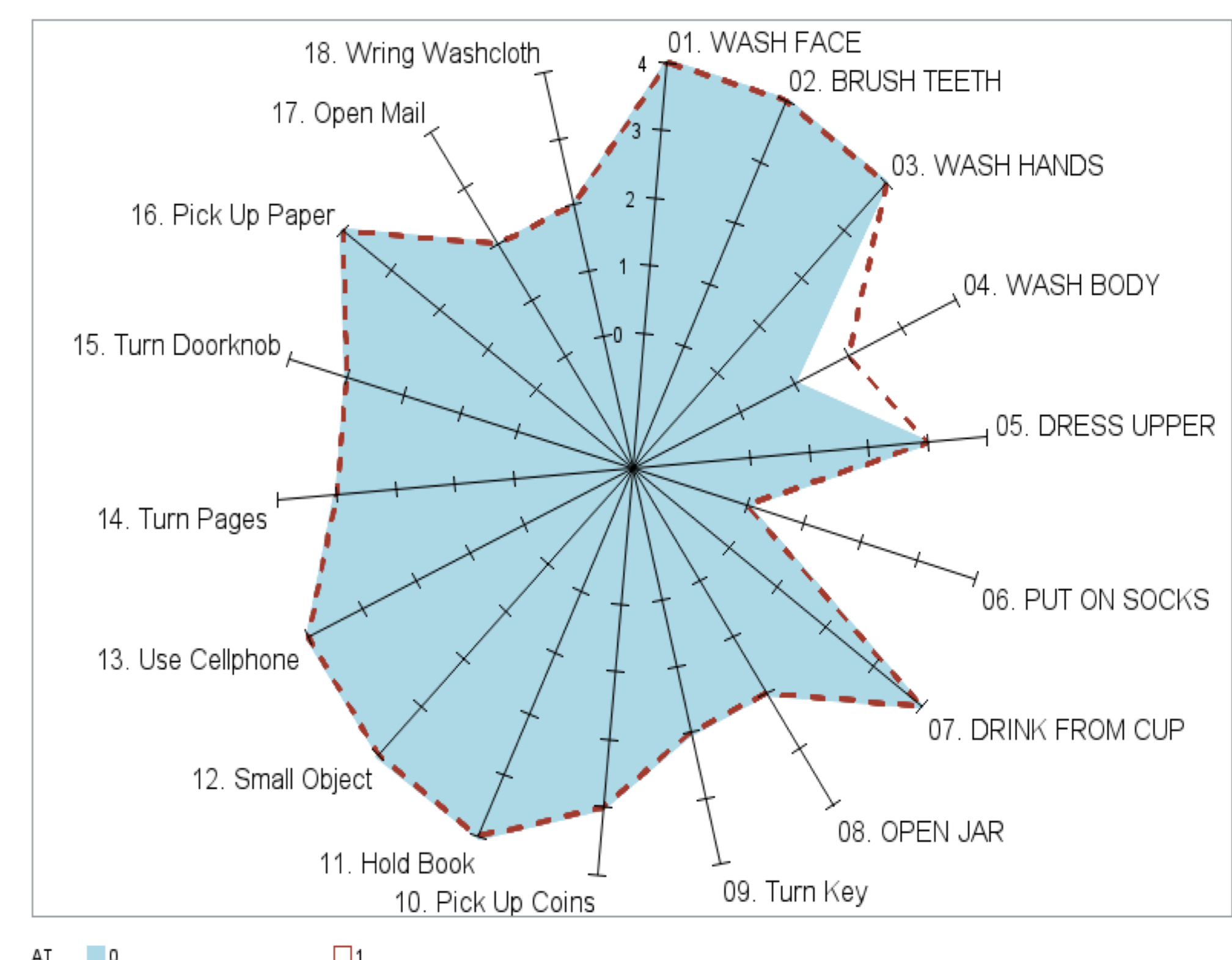
**To right:**

- SCI-FI self-care items on right, fine motor items on left.
- Blue shading represents scores without AT; Red dashed line scores with AT.
- Distance along radius from blue shading to red line represents improvement using AT.

C4-C5 CD SCI-FI Median Score at Discharge



C6-T1 AB SCI-FI Median Score at One-year



**Conclusion:** Many persons with tetraplegia are able to perform self-care and fine motor tasks easier using AT, but the benefit depends on the level and severity of injury. There is a decreased reliance on AT over time, which may in part be due to continued recovery after rehabilitation discharge.